MARYLAND'S NONPOINT SOURCE PROGRAM
FFY 2005 Section 319(h) Incremental Proposal

Incremental Project 3

Project Title: **Corsica River Watershed**
Maryland Department of the Environment's
Implementation Monitoring Project

- Monitoring Nutrient Concentrations to Evaluate Effectiveness of BMP Denitrification Retrofits to OSDS's

- Monitoring Nutrients, Sediments, and Loads to Evaluate Effectiveness of Urban Stormwater BMP Implementation.

Proposed Budget:

	OSDS	Stormwater	**Total**
Federal §319:	$44,483	$32,742	**$77,225**
Non-Federal Match:	$29,655	$21,828	**$51,483**
Total:	$74,138	$54,570	**$128,708**

Project Funding Period: October 01, 2005 to September 30, 2006

Expected Duration: Oct 1, 2005 – Sept 30, 2008

Project Area: Corsica River Watershed
Priority Category 1, 02130507
WRAS Developed
TMDL Approved – Nitrogen & Phosphorus
303(d) List: Bacteria (1996), Biological (2004 draft, 2002), Sediments (1996), Toxics (2002)

Sponsoring Agency: Maryland Dept of the Environment
1800 Washington Blvd
Baltimore, MD 21230

Contact Persons: Niles L. Primrose
Maryland Dept of the Environment
1800 Washington Blvd
Baltimore, MD 21230
1 443 482 2705
nprimrose@mde.state.md.us

Federal Tax ID Number: 52-6002033

Date Submitted: June 30, 2005

Monitoring Nutrient Concentrations to Evaluate Effectiveness of BMP Denitrification Retrofits to On-Site Disposal Systems (OSDS)

Onsite sewage disposal systems (OSDS) have been the traditional method for treating wastewater from residential, institutional, and commercial facilities not serviced by a central wastewater collection facility. As a significant portion of the non-agricultural nonpoint source nutrient load in the Corsica River watershed, septic systems are an item of special concern relative to addressing the nutrient TMDL in the Corsica River.

This project will monitor the Town of Centreville's upgrade of 30 septic systems that lie in close proximity to impaired streams. Conventional systems that are currently permitted in the County discharge 40 - 60 mg/l of nitrogen (estimated N content in what flows from the whole septic system into the groundwater). There are existing systems that are installed in marginal soils, some are very poorly (if ever) maintained, some lie within 300 feet of a tributary stream or the edge of tidal water, and employ dated technology not capable of any significant nutrient reduction.

Many innovative systems are now commercially available, some of which are currently pre-qualified for installation in Queen Anne's County by the Queen Anne's County Environmental Health Department. The initial goal is to reduce nitrogen contribution from 30 OSDSs to about 20-25 mg/l. For the purposes of this initiative, 80-100 gallons per day per capita is used to determine total annual flow. This will reduce nitrogen inputs to the Corsica by an estimated 365 lbs per year. In areas with a close proximity to streams, this could have significant local water quality impacts.

Goals and Objectives

The goal of this project is to monitor the effectiveness of retrofitting conventional OSDSs with nitrogen reducing technology in the Corsica watershed. Similar research was conducted in watersheds with significantly different soils and showed some success in reducing the nitrogen load delivered to the surface aquifer, and by extension to the surface waters in the watershed.

Six systems will be monitored. Two of the 30 proposed retrofit sites, two traditional OSDS with no planned upgrade, and two new homes with nitrogen reducing OSDSs installed as original equipment will be examined. An array of 4 to 6 shallow wells will be installed within and down gradient of each drain field to monitor the nutrient (NO2, NO3, NH4, PO4 and TKN) concentrations being discharged to the shallow ground water.

Our experience with this methodology in an ongoing OSDS study in Calvert County, Maryland, tracking discharge plumes from a traditional OSDS and an innovative community system with BNR that discharges through a root zone (3 inches deep) drip irrigation system, has shown it to be effective at detecting changes in groundwater nutrient concentrations (Brownlee et al, 2004). The steep topography, well-drained soils, and numerous residences within the 300-foot critical area along portions of the Corsica shoreline are ideally suited for this type of study.

Literature Sited

Brownlee, David; N. Primrose; J. McCoy. The Impact of Septic Systems on Groundwater Quality in Hunting Creek Watershed, Calvert County; A Shared Facility with Nitrogen Removal VS Conventional Septic System. Platform presentation Maryland Water Monitoring Council Annual Meeting, Linthicum, MD. November, 2004

Cooperating agencies for OSDS work:

Agency	**Organization**	**Role/Responsibility**
MDE	Lead agency	OSDS: Project management, data analysis. Assist with selection, sampling well installation, and data analysis
Queen Anne's County Health Dept	Cooperator	OSDS: Hires contractual employee. Identify potential systems. Contact homeowners. Coordinate retrofit installation. Assist with sampling well installation. Collect and ship samples to DHMH.
Town of Centreville	Cooperator	OSDS: Help identify potential systems. Contact home owners
MD Dept of Health and Mental Hygiene	Cooperator	OSDS: Sample analysis. (24 samples per month for 3 years).
DNR, MD Geologic Survey	Cooperator	OSDS: Assist with sampling well placement and installation.

Time line for OSDS monitoring work:

Activities	**Timeline**	**Responsible Entity**	**Deliverables**
Administer grant	October 1, 2005 to September 31 2006	MDE	Ensure cooperators deliverables timely production. Authorize fund dispersal
Project management	October 1, 2005 to September 31 2006	MDE	Submit quarterly and final reports
Hire contractual employee	October 2005	Queen Anne's County Health Dept	Contractual employee on staff
Identify equivalent of 30 single family septic systems to retrofit	November 2005	MDE (lead), DNR, MDGS, QA County Health Department, Town of Centreville	List and map of systems identified for retrofit
Well placement	December 2005	MDE, DNR, MD Geologic Survey	Mapped well locations
Well installation	December 2005	MDE, QA Health, DNR	Sampling wells installed
Collect samples	December 2005 – January 2008	Queen Anne's Co. Health Dept.	Data reports
Sample analysis of results to date.	December 2005 – September 31, 2006	MD DHMH	Analysis results

BUDGET

Grant Year and Name: FFY 2005 Section 319(h) Incremental Grant
FFY 2006 Section 319(h) Incremental Grant
FFY 2007 Section 319(h) Incremental Grant

Agency/Organization: Maryland Department of the Environment
Project Period: Oct 1, 2005 – Sept. 30, 2008
Project Name: Corsica River Watershed
Maryland Department of the Environment's
Implementation Monitoring Project

Monitoring Nutrient Concentrations to Evaluate Effectiveness of Denitrification Retrofits to OSDS's

Category	**Match Year 1**	**319(h) Year 1**	**Total Project Cost Year 1**	**319(h) Year 2**	**319(h) Year 3**	**Total**
Queen Anne's County Health Department Technician. Salary FTE contractual. Fringe (5%).		$31,888 1,595		33,077 1,654	34,315 1,716	99, 280 4,965
Telephone		1,000		500	500	2,000
Compute/software		4,000		500	500	5,000
Supplies and materials		5,000		500	500	6,000
Travel		1,000		1,000	1,000	3,000
Laboratory Services (DHMH) match	(5,000)			(5,000)	(5,000)	15,000
MDE match	(24,655)			(19,195)	(20,163)	
TOTAL	**Total Match $29,655**	**Total 319(h) $44,483**	**Total Project Cost Year 1 $74,138**			

Quarterly spending schedule

1st Quarter	**2nd Quarter**	**3rd Quarter**	**4th Quarter**	**Total**
$11,120	$11,120	$11,120	$11,120	$44,483

Monitoring Nutrients, Sediments, and Loads to Evaluate Effectiveness of Urban Stormwater BMP Implementation.

Uncontrolled stormwater discharges often have multiple impacts to the receiving water body. Two impacts of major concern in the Corsica watershed are nutrients and sediment, and the physical volume of the discharge delivered by urban storm water. The town of Centreville is of a size that does not require an NPDES permit for storm water discharge, or any of the associated monitoring. The position of the town on the landscape, on a ridge between two Corsica tributaries, and at the head of tide for the Corsica makes stormwater an important factor in any attempt to control sediment and nutrients entering the river. The characterization of nutrient and sediment loads from the urban storm water source will be important for TMDL implementation.

Goals and Objectives

The goal of this project is to monitor the effectiveness of the implementation of urban storm water best management practices such as street sweeping, rain gardens, and wetland retention facilities to reduce nutrient concentrations, sediment loads, and storm water volume to Gravel Branch and Mill Stream Branch.

The primary objective of this project would be to capture first flush storm water samples from 12 to 16 storm events per year to characterize the nutrient and sediment concentrations delivered to Gravel Branch and Mill Stream Branch before and after implementation of urban storm water BMPs. A secondary objective would be to characterize the nutrient and sediment loads delivered to Gravel Branch and Mill Stream Branch before and after implementation of urban storm water BMPs.

Cooperating Agencies for Urban storm water retrofit monitoring project:

Agency	**Organization**	**Role/Responsibility**
MDE	Lead Agency	Project management, monitoring**,** data analysis, and interim and final report
Town of Centerville	Cooperator	Retrofit site identification
DNR	Cooperator	Sampling design consultation
Chesapeake Biological Laboratory (CBL)	Cooperator	Sample analysis

Timeline for Urban storm water retrofit monitoring project:

Activities	**Timeline**	**Responsible Entity**	**Deliverables**

Project management	October 1, 2005 to September 31 2006	MDE	QSRs, annual report and final report
Sampling design consultation	October -November 2005	DNR	Comment on MDE sampling design
Monitoring equipment installation	Fall 2005	MDE	Monitoring equipment installed at storm water outfalls
Sample collection	Winter 2005 – fall 2008	MDE	QSR Data reports
Sample analysis	Winter 2005 – fall 2008	CBL	Analysis results
Retrofit site identification	Spring 2006	Town of Centreville	Site map

BUDGET REQUEST

Grant Year and Name: FFY 2005 Section 319(h) Incremental Grant
FFY 2006 Section 319(h) Incremental Grant
FFY 2007 Section 319(h) Incremental Grant

Agency/Organization: Maryland Department of the Environment
Project Period: Oct 1, 2005 – Sept. 30, 2008
Project Name: Corsica River Watershed
Maryland Department of the Environment's
Implementation Monitoring Project

Monitoring Nutrients, Sediments, and Loads to Evaluate Effectiveness of Urban Stormwater BMP Implementation.

Category	**319(h) Year 1**	**Non-federal Match**	**Total Project Year 1**	**319(h) Year 2**	**319(h) Year 3**	**Total**
Salary (50% FTE Contractual) NRB I base)	$15,944		$15,944	16,539	17,158	49,641
Fringe (5%)	798		798	827	858	2,483
Supplies and materials	10,000		10,000	5,000	2,000	17,000
Travel	1,000		1,000	1,000	1,000	3,000
Laboratory Services (CBL)	5,000		5,000	5,000	5,000	15,000
MDE match		$21,828	$21,828			
TOTAL	**$32,742**	**$21,828**	**$54,570**			

Quarterly spending schedule

1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Total
$8,185	$8,185	$8,185	$8,185	$32,742